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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,283	11/19/2001	Munenori Iizuka	Q67302	8484

7590 02/05/2003

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EXAMINER

AUGHENBAUGH, WALTER

ART UNIT	PAPER NUMBER
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1772

DATE MAILED: 02/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/988,283

Applicant(s)

IIZUKA ET AL.

Examiner

Walter B Aughenbaugh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☒ Claim(s) 2, 13-18, 22, 26, 37-42 and 46 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION***Claim Objections***

1. Claims 13-18 and 37-42 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 13-15 and 37-39 are directed to the "micro-spherical inorganic material" claimed in claims 12 and 36, and claims 16-18 and 40-42 are directed to the "flake-shaped inorganic material" claimed in claims 12 and 36. These two sets of claims, claims 13-15 and 37-39 and claims 16-18 and 40-42, do not constitute a further limitation because the sets of claims require that a particular species of inorganic material be addressed while the independent claims 12 and 36 do not require that a specific species be addressed.
2. Claims 2, 22, 26 and 46 are objected to because of the following informalities: the use of "ASTM-D570" and "JIS B0601" is unnecessary since these standards are provided in the specification (e.g. pages 26 and 28). Appropriate correction is required. If these standards are kept in the claims, the abbreviations "ASTM" and "JIS" must be written out in full.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
4. Claims 23 and 47 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one

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skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The description of the quantity "tan δ " provided in the specification (page 25 and 33-34) does not provide explanation as to how the quantity "tan δ " is derived from the "complex modulus of elasticity" that is disclosed as being measured. The specification merely notes that "a complex modulus of elasticity of the test piece is measured" (page 25) without any explanation of the role that determination of "complex modulus of elasticity" plays in determining "tan δ " of a particular test piece.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regard to claims 1, 3, 25 and 27, the term "low water absorption resin" is an indefinite relative term because the claim does not provide a standard for determining what constitutes a "low water absorption resin".

The terms "containing" (claims 1, 8, 12, 25, 32 and 36) and "contains" (claims 6, 10, 11, 24, 30, 34, 35 and 48) are indefinite because it is unclear whether "containing" and "contains" is intended to be an open or closed transitional phrase claim indicator. Please replace "contain" with "comprise" or "consist" to denote open or closed language, respectively.

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In regard to claims 2 and 26, phrase “which percentage is in a range of 0.3% or less” is indefinite because it is unclear 1) what “percentage” is referring to (amend to “water absorption percentage” and 2) the basis of the percentage- 0.3% of what?

In regard to claims 4 and 28, the term “MXD6” is indefinite. The chemical composition represented by this formula must be provided (see page 16, lines 31-35 of specification).

In regard to claim 8 and 32, the abbreviation “DBP” must be spelled out in full.

In regard to claims 12 and 36, the term “flake-shaped” is indefinite. The structure intended to be recited by this term is unclear.

In regard to claims 14 and 38, the term “fly ash” is indefinite because the chemical composition intended to be recited by the term “fly ash” is not disclosed. The specification does not disclose the chemical composition of “fly ash” in the section of the specification where fly ash is discussed (page 20, line 15).

In regard to claims 23 and 47, the quantity that “ $\tan \delta$ ” is a measurement of is not clear. What is “a frequency characteristic”? The term “frequency characteristic” is indefinite. The phrase “measured by a one-end fixation method using an apparatus for measuring a complex modulus of elasticity” appears to be a method limitation drawn to a method for measuring the “ $\tan \delta$ ” value of the composition- it is improper to include method limitations in article claims. What is the relationship between “complex modulus of elasticity” and “ $\tan \delta$ ”? What is the “complex modulus of elasticity” and how does it relate to “ $\tan \delta$ ”? Why is “complex modulus of elasticity” recited in the claim, which does not recite a “complex modulus of elasticity” value or range?

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 12 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshinaka et al.

Yoshinaka et al. teach an electrophotographic photosensitive member comprised of a cylindrical support (base body) and a photosensitive layer formed on an outer peripheral surface of the base body (col. 2, lines 53-56). Yoshinaka et al. teach that the support satisfies the strength requirements for a support (col. 10, lines 42-46). Yoshinaka et al. teach that the support is composed of a resin and an inorganic filler (tetrapod-like zinc oxide whiskers, col. 10, lines 43-44) that provide the required strength to the support (col. 10, lines 42-44, Figures 1 and 3, and col. 12, lines 25-55). Yoshinaka et al. teach that the zinc oxide whiskers are comprised of a central part and extending to four different axial directions from this central part (col. 11, lines 61-64). Examiner interprets the morphology of the “tetrapod-like zinc oxide whiskers” taught by Yoshinaka et al. to be a flake-shaped morphology. Furthermore, Yoshinaka et al. teach that inorganic flakes are suitable as an additional filler (col. 12, lines 32-39). Both the tetrapod-like zinc oxide whiskers and the additional flakes taught by Yoshinaka et al. perform the intended use function of “for reinforcement” as claimed by Applicants since Yoshinaka et al. teach that the support satisfies the strength requirements for a support (col. 10, lines 42-46).

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Note that the phrase in claims 12 and 36 "which is obtained by molding a conductive resin into a cylindrical shape" is a method limitation which has not been given patentable weight since the method of forming the base body or photosensitive drum is not germane to the issue of patentability of the base body or photosensitive drum itself.

9. Claims 19, 20, 43 and 44 are rejected under 35 U.S.C. 102(b) as being anticipated by Kito et al. (Patent Abstracts of Japan, publication number 62-141565).

Kito et al. teach a cylindrical electrophotographic sensitive base body formed from a resin having a photosensitive layer formed on an outer peripheral surface of the base body. Kito et al. teach that a fibrous inorganic filler (potassium titanate whiskers) is included in the resin. Kito et al. teach that the average fiber length of the whiskers is 8-20 microns and the average fiber diameter is 0.2-0.7 microns. The fibers taught by Kito et al. are of the same composition of the fibers claimed by Applicants and the average fiber length and diameter ranges of the fibers taught by Kito et al. overlap with those of the fibers claimed by Applicants; therefore, the fibers of Kito et al. necessarily perform the intended use function of "for reinforcement" as claimed by Applicants.

Note that the phrase in claims 19 and 43 "which is obtained by molding a conductive resin into a cylindrical shape" is a method limitation which has not been given patentable weight since the method of forming the base body or photosensitive drum is not germane to the issue of patentability of the base body or photosensitive drum itself.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 1-5 and 25-29 rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al. in view of Nishimuro et al.

In regard to claims 1, 3, 4, 25, 27 and 28, Matsuura et al. teach a polymer sheet formed of a mixture of polyamide and polypropylene or polyphenylene sulfide (col. 2, lines 29-37). The mixture of polyamide and polypropylene or polyphenylene sulfide taught by Matsuura et al. corresponds to the resin base material as claimed by Applicants. Matsuura et al. teach that the sheet is stable in regard to the effect of water vapor with the passage of time (col. 1, line 64-col. 2, line 2); Matsuura et al. therefore teach that the polypropylene or polyphenylene sulfide is a low water absorption resin. Matsuura et al. teach the addition of conductive powder to polymer sheets (col. 1, lines 11-13). In regard to claim 25, Matsuura et al. teach the inclusion of a photoconductor layer on the peripheral surface of the sheet of the resin base material for the intended uses as a electrostatic recording sheet or electrophotographic photosensitive material (col. 5, lines 19-27).

Matsuura et al. fail to teach that the sheet is in cylindrical form.

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Nishimuro et al., however, disclose a cylindrical base body (item 1, Figure 1) for a photosensitive drum that is molded from a resin to which a conductive agent is added (col. 2, lines 64-67). In regard to claims 4 and 28, Nishimuro et al. disclose that polyamides such as nylon 6 or nylon 66 are suitable as the resin (col. 3, lines 3-8). Nishimuro et al. also disclose that a photosensitive layer (item 3, Figure 1) is formed on the outer peripheral surface of the cylindrical base body. Nishimuro et al. disclose that the photosensitive drum is used in electrostatic recording processes (col. 1, lines 4-9). Therefore, one of ordinary skill in the art would have recognized to have formed the conductive mixed resin of Matsuura et al. into a cylinder, since it is notoriously well known to one of ordinary skill in the art to use cylindrical moldings of conductive resins as a base body of electrostatic recording devices as taught by Nishimuro et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the conductive mixed resin of Matsuura et al. into a cylinder, since it is notoriously well known to one of ordinary skill in the art to use cylindrical moldings of conductive resins as a base body of electrostatic recording devices as taught by Nishimuro et al.

In regard to claims 2, 5, 26 and 29, Matsuura et al. fail to teach that the low water absorption resin has a water absorption percentage in a range of 0.3% or less or that the content of the low water absorption resin is 1 to 70 wt % on the basis of the total weight of the resin base material. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have varied the content of the low water absorption resin relative to the total weight of the resin base material through routine experimentation in order to determine the optimum water absorption percentage for achievement of the desired water absorption percentage

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depending on the desired end user result, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art in the absence of unexpected results. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Note that the phrase in claims 1 and 25 “which is obtained by molding a conductive resin into a cylindrical shape” is a method limitation which has not been given patentable weight since the method of forming the base body or photosensitive drum is not germane to the issue of patentability of the base body or photosensitive drum itself.

12. Claims 6, 7, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al. in view of Nishimuro et al., and in further view of Coran et al.

Matsuura et al. and Nishimuro et al. teach the cylindrical base body and photosensitive layer as discussed above. Matsuura et al. and Nishimuro et al. fail to teach that the conductive resin composition further comprises a compatibility enhancing agent for enhancing a compatibility between the polyamide resin and the low water absorption resin. Coran et al., however, disclose a thermoplastic composition comprising a polyolefin polymer, a nylon (a polyamide polymer) and a functionalized olefin polymer (col. 8, lines 29-42). Coran et al. disclose that maleic acid modified polypropylene compatibilizes polypropylene and nylon (polyamide) (col. 8, lines 8-10). The maleic acid modified polypropylene taught by Coran et al. is a functionalized olefin polymer. Therefore, one of ordinary skill in the art would have recognized to have added maleic acid modified polypropylene to the mixture of polypropylene and polyamide taught by Matsuura et al. in order to compatibilize the mixture of polypropylene and polyamide as taught by Coran et al.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to have added maleic acid modified polypropylene to the mixture of polypropylene and polyamide taught by Matsuura et al. in order to compatibilize the mixture of polypropylene and polyamide as taught by Coran et al.

13. Claims 8-11 and 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iizuka et al. in view of Sakano et al.

Iizuka et al. teach a photosensitive drum with cylindrical base body (item 1, Figure 1) and a photosensitive layer (item 3, Figure 1) formed on its peripheral surface. Iizuka et al. further teach that the cylindrical base is formed from an electrically conductive resin composition which is obtained from meta-xylylenediamine and adipic acid and/or a polyamide resin which is obtained from ϵ -caprolactam (col. 3, lines 18-25). Iizuka et al. further teach that the resin composition includes carbon black as an electrically conductive material (col. 3, lines 49-57). Iizuka et al. teach that the electrically conductive material is present in an amount of 5-30% by weight (col. 3, lines 58-61). Iizuka et al. further teach that the base resin includes a reinforcing inorganic filler to improve mechanical properties of the resin (col. 2, lines 60-67). Iizuka et al. fail to teach that the carbon black has a DBP oil absorption amount of 130ml/100g or more. Sakano et al., however, disclose an electroplated product made of a conductive resin such as carbon black- containing polyamide (col. 1, lines 5-19 and col. 2 lines 6-14). Sakano et al. disclose that the carbon black has a DBP oil absorption amount of not less than 200ml/100g so that the electroplating of the product is of good quality (col. 2, lines 37-42). Sakano et al. disclose that electroplating of a product requires that the product be conductive (col. 1, lines 16-19). Therefore, one of ordinary skill in the art would have recognized to have used carbon black

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having a DBP oil absorption amount of not less than 200ml/100g as the carbon black of Iizuka et al. in order to afford sufficient conductivity to the base body of Iizuka et al. as taught by Sakano et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used carbon black having a DBP oil absorption amount of not less than 200ml/100g as the carbon black of Iizuka et al. in order to afford sufficient conductivity to the base body of Iizuka et al. as taught by Sakano et al.

Note that the phrase in claims 8 and 32 "which is obtained by molding a conductive resin into a cylindrical shape" is a method limitation which has not been given patentable weight since the method of forming the base body or photosensitive drum is not germane to the issue of patentability of the base body or photosensitive drum itself.

14. Claims 21, 22, 45, 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kito et al. in view of Iizuka et al.

Kito et al. teach the laminate of a base body and a photosensitive layer as discussed above. Kito et al. fail to teach that content of the inorganic material is in a range of 10 – 25 wt% on the basis of the total weight of the conductive resin composition, and that the base body has a surface roughness such that a center line average height Ra is less than 0.2 micron and a maximum height Rmax is less than 0.8 micron. Iizuka et al., however, disclose the photosensitive drum as discussed above.

In regard to claims 21 and 45, Iizuka et al. teach that an inorganic filler in the form of a fiber is present in an amount of 1-30% by weight to provide a product exhibiting improved strength and stiffness (col. 3, line 65-col. 4, line 15). Therefore, one of ordinary skill in the art

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would have recognized to have limited the content of the inorganic material of Kito et al. to a range of 10 – 25 wt% on the basis of the total weight of the conductive resin composition in order to provide a product exhibiting improved strength and stiffness as taught by Iizuka et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have limited the content of the inorganic material of Kito et al. to a range of 10 – 25 wt% on the basis of the total weight of the conductive resin composition in order to provide a product exhibiting improved strength and stiffness as taught by Iizuka et al.

In regard to claims 22 and 46, Iizuka et al. disclose that the peripheral surface of the cylindrical base has irregularities having a center line average height (Ra) that is smaller than $0.2\mu\text{m}$ and a maximum height (Rmax) that is smaller than $0.8\mu\text{m}$ (col. 4, lines 47-55). Iizuka et al. disclose that if the Ra or Rmax of the surface of the base are larger than the specified values, the surface irregularities manifest themselves in the photosensitive layer 3, which covers the base 1 (see Figure 1), resulting in a poor image (col. 4, lines 55-62). Therefore, one of ordinary skill in the art would have recognized to limit the surface roughness of the base body of Kito et al. to the Ra and Rmax values taught by Iizuka et al. via geometrical control of the surface irregularities of Kito et al. in order to avoid manifestation of the surface irregularities in the photosensitive layer, thus avoiding poor imaging as taught by Iizuka et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have limited the surface roughness of the base body of Kito et al. to the Ra and Rmax ranges taught by Iizuka et al. via geometrical control of the surface irregularities of Kito et al. in order to avoid manifestation of the surface irregularities in the photosensitive layer, thus avoiding poor imaging as taught by Iizuka et al.

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15. Claims 23, 24, 47, 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al.

Morita et al. teach a cylindrical sound deadening member (item 3, Figure 1B) and a photosensitive receptor drum (item 1, Figure 1B) on the outer peripheral surface of the sound deadening member (col. 11, lines 43-50). The sound deadening member is equivalent to the base body as claimed by Applicants and the photosensitive receptor drum is equivalent to the photosensitive layer as claimed by Applicants. In regard to claims 24 and 25, the Morita et al. fail to teach that the resin composition has a factor $\tan \delta$ expressing a frequency characteristic of the composition of 0.05 or more. The method by which the factor $\tan \delta$ is measured is not pertinent to the patentability of the base body or photosensitive drum, and therefore the phrase "measured by a one-end fixation method using an apparatus for measuring a complex modulus of elasticity" is given little patentable weight. However, Morita et al. teach that the relative amounts of the components of the resin composition are such that the vibration damping property and bending modulus of elasticity are adequate for the effective dampening of vibration (col. 7, lines 37-44) and for the use as a structural body (col. 7, lines 61-65). As " $\tan \delta$ " is claimed as an expression of a frequency characteristic of composition undergoing a test for complex modulus of elasticity, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have varied the relative amounts of the components of the resin composition through routine experimentation in order to achieve the optimal frequency characteristic as expressed by " $\tan \delta$ " such that the vibration damping property and bending modulus of elasticity are adequate for the effective dampening of vibration (col. 7, lines 37-44) and for the use as a structural body (col. 7, lines 61-65), since it has been held that discovering an

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optimum value of a result effective variable involves only routine skill in the art in the absence of unexpected results. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Note that the phrase in claims 23 and 47 "which is obtained by molding a conductive resin into a cylindrical shape" is a method limitation which has not been given patentable weight since the method of forming the base body or photosensitive drum is not germane to the issue of patentability of the base body or photosensitive drum itself.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. 4,664,995 to Horgan et al.


17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter B Aughenbaugh whose telephone number is 703-305-4511. The examiner can normally be reached on Monday-Friday from 9:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on 703-308-4251. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

wba
01/24/03

WBA


HAROLD PYON
SUPERVISORY PATENT EXAMINER
1772

1/27/03